Executive summary

The objective of the *Iowa Renewable Energy Resource Guide* is to illustrate the current and future direction of "homegrown" energy in Iowa.

Iowa's natural resources — including strong winds, fertile soil, and native vegetation — combined with the state's agricultural expertise, position Iowa as a national leader in the development of a renewable energy industry.

With a $6.6 billion energy bill in 1999, Iowa's economy and environment have much to gain from renewable energy development. Increased production of renewable resources reduces Iowa's reliance on imported fuels, decreases national security concerns, and creates new opportunities for value-added agriculture products. From an environmental standpoint, renewable energy production and use benefit the state's air, soil and water quality.

Iowa's commitment to improving its economy and environment is evident in several state laws that support and promote renewable energy. The state has established several tax incentives, grant programs, and educational opportunities to increase renewable energy. In the future, statutory support for renewables could come in the form of tax incentives, wire charges, net metering, customer-choice programs and other funding initiatives.

Iowa's Renewable Energy Resources

Wind

Wind energy is Iowa's fastest growing renewable energy resource. Decreasing capital costs, technological advances and favorable legislation have made Iowa a leader in wind electricity production.

As the tenth windiest state in the nation, 40 percent of Iowa's land area is capable of generating wind power. Wind is virtually a "clean" energy resource, creating no air emissions during electricity production, thus helping Iowa's environment.

As of July 2002, Iowa had 335 MW of electricity nameplate capacity (100.5 MW of actual capacity) from wind. Three large wind farms in Buena Vista, Cerro Gordo and Worth counties greatly contribute to this level of production.

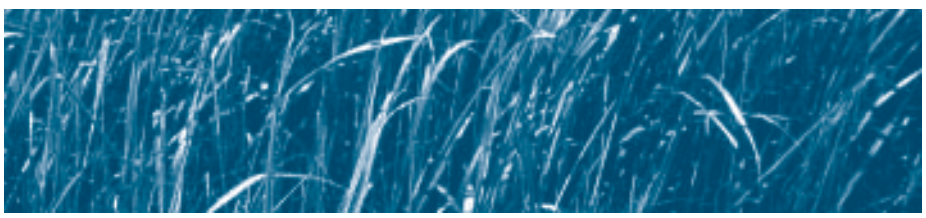
Hydropower

Hydropower is the leading renewable energy source for electricity production in Iowa.* The state's 10 major hydro plants have 134 MW of capacity, and represent just under 3 percent of Iowa's total electricity production.

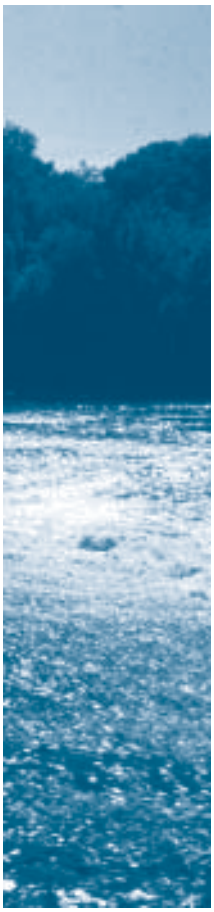
Although hydropower is a significant source for electricity generation, economic and environmental barriers limit its growth potential. Currently, many of the best hydropower sites in Iowa are operating at full capacity, limiting further expansion.

Solar Power

Although solar power is not commonly used in Iowa, energy from the sun can be captured to produce electricity, generate heat, or even to run a vehicle. Collection of solar energy can occur through photovoltaic systems, solar-thermal applications, or direct solar gain.



*Hydropower is the largest renewable resource for electricity production, but biomass is the most consumed renewable energy resource overall, including in transportation, heating and electricity.



Solar power initiatives in Iowa and the nation include the use of passive solar design in buildings, Iowa State University's solar-powered cars, solar road equipment operated by the Department of Transportation, and Million Solar Roofs.

Biomass

Biomass represents an entire category of energy sources made from organic material of recent biological origin, including crops, wood, animal by-products, residues and wastes. An abundance of raw materials and technical knowledge make Iowa a leader in this field. Iowa's most significant biomass resources are renewable transportation fuels, energy crops and methane recovery.

Renewable Transportation Fuels

Renewable transportation fuels include ethanol — both E10 (10 percent ethanol, 90 percent gasoline) and E85 (85 percent ethanol, 15 percent gasoline) — and biodiesel. Iowa's ethanol industry creates more than $1.7 billion in economic activity and affects more than 13,250 jobs.

Currently, 53 percent of Iowans choose ethanol when fueling their vehicles. Ethanol production and consumption have grown extensively due to supportive state and federal legislation, an expanding infrastructure and public education. Strengthening international markets, development of flexible-fuel vehicles, and advancing technology also have increased ethanol use.

Although corn is currently the primary feedstock of ethanol, other resources such as corn residues, switchgrass, and waste materials could eventually surpass corn's use. Additionally, biodiesel — produced in Iowa from soybean oil — is being developed and marketed.

Methane Recovery

The capturing of methane gas for electricity and heat generation is a growing practice in Iowa. Methane recovery at livestock facilities, wastewater treatment plants and landfills can help control odor and pollution, while creating a revenue stream for facility owners.

Methane recovery at livestock operations is being examined and discussed extensively in the state. Two demonstration projects are occuring at the Top Deck Dairy in Westgate and the Northeast Iowa Community College dairy in Calmar. Additionally, two Iowa landfills are capturing methane, producing a total of 7.5 megawatts of electricity each year.

Switchgrass and Other Energy Crops

Energy crops, including herbaceous and woody crops, hold tremendous opportunities for Iowa's agricultural sector. The nation's largest switchgrass demonstration site is being coordinated in southern Iowa. Switchgrass, a native Iowa prairie grass, can be co-fired at coal-burning power plants, or used as a feedstock for ethanol.

Other energy crops include hybrid poplars and other fast-growing trees. Plantations of trees are being grown throughout Iowa for energy demonstration projects, and are also serving as buffer strips to mitigate water pollution and soil erosion.

Other Biomass Resources

Additional energy resources being researched in Iowa include corn stover, wood residues, and soy-based lubricants. Corn stover is predicted to be one of Iowa's most significant biomass resources in the future.

Renewable Energy Organizations

Many organizations are working to advance renewable energy development in Iowa. These organizations include: the Iowa Department of Natural Resources, the Iowa Energy Center, the Center for Energy and Environmental Education, the Center for Global and Regional Environmental Research, the Iowa Department of Agriculture and Land Stewardship, the Izaak Walton League, the Iowa Renewable Energy Association, the Iowa Sustainable Energy for Economic Development Coalition and many others.